United States Patent and Trademark Office

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,797	08/06/2001	Kanako Nishihashi		7942

				EXAMINER
2292	7590	02/17/2004		NATNAEL, PAULOS M

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

ART UNIT	PAPER NUMBER
2614	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-8 and 29-31* is/are rejected.

7)☒ Claim(s) *4,5,9-28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☒ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.
    a)☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3*.

4)☐ Interview Summary (PTO-413) Paper No(s). _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims **1, 6 and 29** are rejected under 35 U.S.C. 102(e) as being anticipated by

Fujino U.S. Pat. No. **6,215,525.**

Considering claim **1**, Fujino discloses all claimed subject matter, note;

a) a virtual interpolation data generating means for generating interpolation data of inter-

lines between the lines of the input image, based on the input image line

data, is met by interpolated data generator 19, fig.1; (See also figs. 2-4 which show

interpolated scanning lines)

b) an interpolating means for interpolating the pixels between input image lines, based

on the generated virtual interpolation data, is met by interpolated data phase shifter 20,

fig.1, which "offsets the interpolated data Z in the horizontal direction with respect to the

pixel phases on the upper and lower scanning lines by the doublers 14 and 15 for

doubling the scanning lines..." (col. 3, 46-51)

Considering claim **6**, the image interpolation system according to Claim 1, wherein the

virtual interpolation data generated by the virtual interpolation data generating means is

constructed of units of pixel-rows of data, is met by the interpolated data Z which is

generated from four pixels A,B,C and D. (col. 3, lines 41-51)

Considering claim **29**, **claim 29** is a method claim of claim **1** and, thus, claim 29 is

rejected for the same reasons as claim **1**.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims **2,3, 7,8 30 and 31 are** rejected under 35 U.S.C. 103(a) as being

unpatentable over **Fujino** U.S. Pat. No. **6,215,525 in view of** Chui, U.S. Pat. No.

6,496,608.

Considering claim **2**, Fujino discloses the following claimed subject matter, note;

a) a virtual interpolation data generating means for generating interpolation data of inter-

lines between the lines of the input image, based on the input image line

data, is met by interpolated data generator 19, fig.1; (See also figs. 2-4 which show

interpolated scanning lines)

b) an interpolating means for interpolating the pixels between input image lines, based

on the generated virtual interpolation data, is met by interpolated data phase shifter 20,

fig.1, which "offsets the interpolated data Z in the horizontal direction with respect to the

pixel phases on the upper and lower scanning lines by the doublers 14 and 15 for

doubling the scanning lines..." (col. 3, 46-51)

Except for;

c) the interpolating means which, based on the generated virtual interpolation data,

generates pre-Interpolation pixels on the input image lines;

Regarding c), Fujino does not specifically disclose generating a pre-interpolation

pixels on the input image lines. Fujino however discloses generating the interpolation

pixels A,B,C, and D in generating the interpolation data Z. Chui discloses an image

data interpolation system and method, and teaches a method of interpolation (illustrated

in Fig.9) by first generating fill-in pixel values (step 205), remapping pixels to locations

base on actual magnification power (step 206), (which would be equivalent, given

reasonably broad interpretation, to the claimed generated interpolation data), and finally

generating fill-in pixel values with Barycentric or bilinear interpolation methods (step

207) . Therefore, it would have been obvious to the skilled in the art at the time the

invention was made to modify the system of Fujino by providing the method of

generating pixel values **before** the actual interpolation method is applied or utilized as in

Chui, so that the image is multiplied or interpolated by a desired multiple interpolation

factor.

Considering claim **3**,

a) a virtual interpolation data generating means for generating interpolation data of inter-

lines between the lines of the input image, based on the input image line

data, is met by interpolated data generator 19, fig.1; (See also figs. 2-4 which show

interpolated scanning lines)

b) interpolation segment determining means for determining segments to be

interpolated between the input image lines and the direction of interpolation, based on

the generated virtual interpolation data, is met by interpolated data phase shifter 20,

fig.1, which "offsets the interpolated data Z in the horizontal direction with respect to the

pixel phases on the upper and lower scanning lines by the doublers 14 and 15 for

doubling the scanning lines..." (col. 3, 46-51)

        Except for;

c) an interpolating means which generates pre- interpolation pixels on the input image

lines, based on the generated virtual interpolation data and the determined data of the

segments to be interpolated, determined by the interpolation segment determining

means, and interpolates the pixels between input image lines based on the generated

pre-interpolation pixels;

Regarding c), see rejection of claim 2(c).

Considering claim **7**, the claimed wherein the virtual interpolation data generated by the

virtual interpolation data generating means is constructed of units of pixel-rows of data,

is met by the interpolated data Z which is generated from four pixels A,B,C and D. (col.

3, lines 41-51)

Considering claim **8,** see rejection of claim 7.

Considering claim **30**, claim 30 is a method claim of claim **2** and, thus, claim 30 is

rejected for the same reasons as claim 2.

Considering claim **31**, claim 31 is a method claim of claim 3 and, thus, claim 31 is

rejected for the same reasons as claim 3.

Allowable Subject Matter

5.   Claims **4,5, 9-28** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6.   The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to disclose, an image interpolation system wherein the interpolation segment determining means comprises: a search condition setup means for setting up a pattern search range; a matching pattern condition setup means for setting up matching pattern conditions; and a first matching pattern searching means for searching for matching patterns based on the conditions designated by the search condition setup means and by the matching pattern condition setup means, as in claim 4;

Wherein the interpolation segment determining means comprises: a search condition setup means for setting up a pattern search range; a matching pattern condition setup means for setting up matching pattern conditions; a first matching pattern searching means for searching matching patterns based on the conditions designated by the search condition setup means and by the matching pattern condition setup means; a directional vector extracting means for extracting the direction of the vector of the detected matching patterns; and a second matching pattern searching means for searching for matching patterns existing in the extracted direction of the vector, based on the conditions designated by the search condition setup means and by the matching pattern condition setup means, as in claim 5;

wherein the virtual interpolation data generating means comprises: an inter-pixel operating means for calculating the difference in pixel data between the pixels on the neighboring input image lines; and a normalizing means for classifying the pixels into multiple classes according to the calculated value of the difference in pixel data; and a pattern extracting means for extracting rows of pixels normalized and classified in an identical class as patterns, as in claims **11-16**;

wherein the virtual interpolation data generating means comprises: an inter-pixel operating means for calculating the difference in pixel data between the pixels on the neighboring input image lines; a normalizing means for classifying the pixels into multiple classes according to the calculated value of the difference in pixel data; a pattern extracting means for extracting rows of pixels normalized and classified in an identical class as patterns; and a coring means for judging the patterns extracted on the same line to be interpolated based on the predetermined threshold and editing them, as in claims **17-22**; and, wherein the coring means comprises: an intra-pattern pixel operating means for calculating the average of the pixel differential values of individual pixels in each pattern; and a pattern editing means for judging the average value based on the predetermined threshold and editing patterns, as in claims **23-28**;

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Greggain et al., U.S. Pat. No. 5,991,463 discloses a source data interpolation method and apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Paulos M. Natnael* whose telephone number is (703) 305-0019. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *John Miller* can be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-HELP.

PMN
February 2, 2004

PAULOS M. NATNAEL
PATENT EXAMINER